

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following remarks is respectfully requested.

Claims 1, 3-4, 6-7, 9-10 and 12 are presently active in this application and are amended herewith, and Claims 2, 5, 8 and 11 having been canceled.

In the outstanding Office Action, Claims 7-9 were rejected under 35 U.S.C. §101 as directed to non-statutory subject matter; and Claims 1-12 were rejected under 35 U.S.C. §102(b) as anticipated by Kartalopoulos (USP 5,590,323).

In response to the objection to the rejection 35 U.S.C. §101, Claims 7 and 9 have been amended to define the subject invention in terms of a computer readable medium, which is clearly recognized to be statutory under 35 U.S.C. §101. Accordingly, this ground for rejection has been overcome and withdrawal thereof is respectfully requested.

In response to the rejection under 35 U.S.C. §102(b), the independent Claims 1, 4, 7 and 10 have been amended to include the features stated in Claims 2, 5, 8 and 11, respectively. Claim 1 has been amended to include the features of Claim 2 and the limitation “the reserved execution terms having same execution start timing and the same term.” The amendments to Claim 1 are supported by original Claim 2 and the description on page 38, line 6 to page 39, line 10, the description on page 60, lines 21-27, and the description on page 89, lines 8-11 of the specification. The amendments to Claims 4, 7 and 10 are supported by the original Claims 5, 8 and 11, which are now canceled. No new matter has been added.

In view of the present changes to Claims 1, 4, 7 and 10, these claims are believed to be patentably distinguishing over the cited prior art, next discussed.

Briefly recapitulating, according to the present invention, a plurality of programs and the structural description information are externally input, and threads are scheduled according to the structural description information.

In general, in order to generate a program for executing a real-time operation, timing constraints such as the execution start timing and end timing of each operation have to be described in detail in codes of the program. This program coding operation requires considerable time and effort.

In the Applicants' invention, on the other hand, the execution start timing and the execution term of each thread are determined based on the externally input structural description information. The structural description information indicates a relationship in input/output between the programs, and includes cost information concerning a time required to execute each of the programs, and coupling attribute information indicative of a coupling attribute between the programs.

By using the structural description information, it is possible to effectively schedule threads for executing a real-time operation without describing in detail timing constraint conditions of each operation in codes of the program.

As described at Column 2, lines 52-61, Kartalopoulos discloses generating a matrix table, but does not disclose inputting the matrix table along with programs to be executed and performing scheduling according to the input matrix table.

Further, in the present invention recited in amended Claim 1, the execution terms of all the threads belonging to the tightly coupled thread group are reserved for a plurality of processors, and the execution start timing of all of the reserved execution terms and the length of the terms are identical. That is, all the threads belonging to the tightly coupled thread group start the execution at the same time and end it at the same time, as shown in FIG. 48 of the present application. Thereby, it is guaranteed that all the threads belonging to the tightly coupled thread group are always and simultaneously in a running state. Thereby, it is possible to effectively perform communications and the like between the threads.

Next, Applicants address specific findings which appear to have been made in the outstanding Office Action. For example, the outstanding Office Action appears to equate the matrix table shown in FIG. 1 of Kartalopoulos to the “structural description information” recited in pending Claim 1. Applicants, however, believe that the matrix table of Kartalopoulos does not correspond to the structural description information of the present invention.

Regarding the recitation “to simultaneously execute the tightly coupled threads by the several processors” formerly recited in Claim 2, the outstanding Office Action states that “each column indicates simultaneous tasks to be processed in a slotted time interval.” However, in each of the columns of the matrix table, the activities have different execution start timings. In other words, in the system of Kartalopoulos, it cannot be assured that specific threads (tightly coupled threads) are always and simultaneously in a running state.

Therefore, Applicants respectfully submit that Kartalopoulos does not disclose the recitation in amended Claim 1 of the following features:

- selecting a tightly coupled thread group from among the plurality of threads based on the coupling attribute information, the tightly coupled thread group including a set of tightly coupled threads running in cooperation with each other;

- reserving execution terms of the tightly coupled threads in several processors of the plurality of the processors, the reserved execution terms having same execution start timing and the same term, the several processors being equal in number to the tightly coupled threads; and

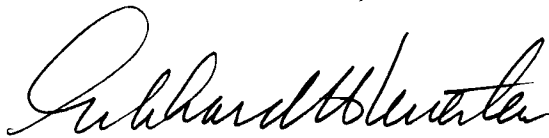
- simultaneously executing the tightly coupled threads in reserved execution terms by the several processors.

Similar changes have been made to Claims 4, 7 and 10 with respect to the above noted “selecting” and “reserving” (or “determining”) steps or functionality stated in Claims 4, 7 and 10. Reconsideration of the outstanding rejection of the amended Claims 1, 3-4, 6-7, 9-10 and 12 is believed to be in order and is respectfully requested.

Accordingly, in view of the present amendment, and in light of the above comments, no further issues are believed to be outstanding, and the present application is believed to be in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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